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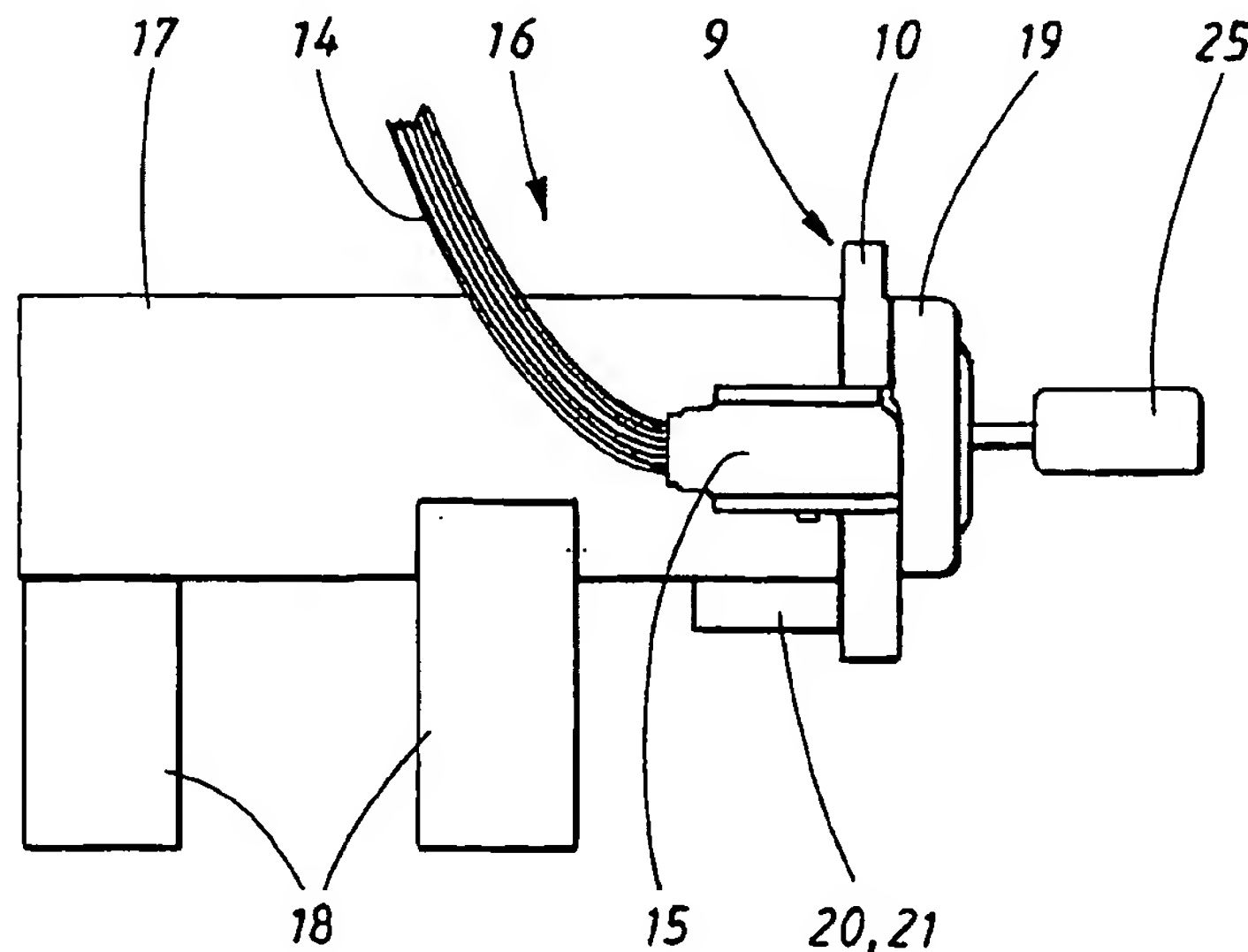
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[Continued on next page]

(54) Title: **DEVICE FOR VEHICLES**



(57) Abstract: The present invention relates to a device for vehicles which comprise an electrical cable mat (1), a so-called ignition lock (11, 16) and an antenna (9) arranged adjacent to the ignition lock which interacts with a transmit/receive device, said antenna being arranged to communicate with a key (25) dedicated to the ignition lock (11, 16). What is new is that the antenna (9) is electrically integrated into the cable mat (1), directly connected to it, and that the ignition lock (11, 16) and the antenna (9) are possible to assemble into one unit by means of coupling means (20-22). The invention also relates to an electrical cable bunch for a motor vehicle, which bunch is intended to interact with an electronic antitheft-system comprising an antenna for receiving signal from an ignition key dedicated to the vehicle and an electronic unit which processes the signals from the antenna with the antenna being integrated contactlessly in the cable bunch.



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## DEVICE FOR VEHICLES

## TECHNICAL FIELD

- 5 The present invention relates to a device for vehicles which comprise an electrical cable bunch, a so-called ignition lock, and an antenna located adjacent to the ignition lock which interacts with a transmit/receive device arranged to communicate with a key dedicated to the ignition lock.

## 10 PRIOR ART

- All motor vehicles contain a prefabricated cable bunch which contains more or less all of the electrical conductors or cables which are necessary in order to tie together all the electrical components of the vehicle into an electrical system. The conductors or cables are thus, when producing the cable bunch,  
15 length-wise adapted to the extension they are to have in the vehicle, and bunched together with, for example, plastic cable, shrinking tube, or some other kind of plastic casing so that they together form one unit, a cable bunch or a cable mat. At the various components, coupling devices are used to connect the conductors of the cable bunch to the components, located in  
20 various places around the vehicle, either via contacts on the components or on cable ends located in the components. All this comprises a cableing.

- A component which has appeared in modern vehicles is comprised in the antitheft-system of these vehicles: a transmit/receive unit which interacts with  
25 one of the ignition keys of the vehicle. For this purpose the ignition lock of the vehicle is delivered with an antenna assembled to it, with or without an amplifier which is assembled on the lock at the end where one of the ignition keys of the vehicle is to be entered during use of the vehicle. It is common to talk about the ignition locks and ignition keys in diesel vehicles also, even if  
30 they do not control an ignition circuit as such. The antenna located on the lock is connected after the lock and the mat have been assembled together in the vehicle via a contact pair, of which the contact which belongs to the

lock can be arranged on a housing which belongs to the antenna and protects it, or on a cable end connected to the antenna (or to an amplifier) connected to the antenna. A problem in this context is that the currents in the conductors in question, especially in cases where no amplifier is used, are  
5 very small. Additionally, the requirements which are present in vehicle environments give the contacts dimensions which are suitable for vehicles, i.e. relatively large dimensions. The combination of large contacts and small currents is unfortunate, since poor contact and loose play can easily arise. A consequence of this can be so-called fretting.

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#### SUMMARY OF THE INVENTION

The above-mentioned problem has, due to the present invention, been solved in a surprisingly advantageous way by letting the antenna be electrically integrated in the cable bunch, directly connected to it, and due to  
15 the fact that the ignition lock and the antenna can be connected into one unit using coupling means. In this way, an electrical cable bunch for a motor vehicle is obtained, which bunch is intended to interact with an electronic antitheft-system comprising an antenna for receiving signals from an ignition key dedicated to the vehicle and an electronic unit which processes the  
20 signals from the antenna, with the antenna being integrated contactlessly in the cable bunch.

In a further advantageous embodiment of the invention, the antenna is encased in a housing which is provided with an opening, the form of which  
25 corresponds to the outer form of the ignition lock across the ignition lock, at that end of it which is intended for entry of the key, with the antenna being attachable outside of the ignition lock, and in the housing being provided with first organs for retaining the housing on the locking cylinder during interaction with corresponding second organs attached to the ignition lock.

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By integrating that component, the antenna, the contact connections of which introduce problems in the system, in the cable bunch during manufacture of

it, the need for connecting electrical contacts is eliminated. Instead, there is introduced an antenna housing with mechanical fastenings which connect the antenna to the ignition lock. In so doing, a simple assembly is obtained in the vehicle so that the antenna is always located well together with the ignition lock, regardless of how it is assembled, for good transmission contact with the key which belongs to the lock. The ignition lock essentially consists of a lock-housing and a lock-cylinder which is rotateable in the housing, and which during its rotation switches a switch connected to the cylinder, which in turn is connected to the cable mat and controls the electrical system of the vehicle, usually a processor. It is the lock-housing and the housing of the antenna which are mechanically attached to each other during assembly in the vehicle.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will in the following be explained in more detail, and be described in connection to the drawings shown in the appended figures, in which

Fig. 1 shows a vehicle cableing which comprises part of a cable bunch belonging to a truck, said part extending up to the wheel controls, with the invention included,

Fig. 2 shows an ignition lock connected to an antenna which is comprised in the invention, and

Fig. 3 shows the assembly of the antenna at the ignition lock in more detail.

#### PREFERRED EMBODIMENT

Fig.1 thus shows a vehicle cableing. From the figure, it will become apparent that the invention comprises a cable bunch 1, in which there is comprised a number of contacts 2, which, when the cable bunch has been assembled in a

vehicle, are normally connected to corresponding contacts 3 which in turn via short cables 4 are connected to one vehicle component each, for example tail lamp control 5, a cruise control 6, a light switch 7 and a control 8. The figure also has other components which are normally comprised in the cableing of a truck, but which are however not described in more detail here since they are not relevant to the invention. According to the invention, the cableing also comprises an antenna 9 which is directly connected in the cable bunch without intermediate contacts or the like. The antenna is integrated already when the cable bunch is manufactured. The antenna is built into an antenna housing 10, preferably moulded in plastic, which in the figure shown is in a position assembled to an ignition lock 11 which is intended to be assembled to a wheel shaft housing 12 for a wheel tube (not shown), arranged in adjustable suspension consoles 13. The ignition lock 11 is normally, at that end of it which is opposite the key end, equipped with a turning switch (not shown) for control of the electrical system of the vehicle by means of the coupling units 26. A cable 14 which is part of the cable bunch 1 and equipped with an appropriate amount of conductors extends into the antenna housing 10 of the antenna 9 via an entry part 15. The cable 14 in its extension in the opposite direction extends through the cable bunch 1, and at another end at a distance from the key-lock 11 connects either fixedly or via a contact (not shown) together with other cables comprised in the cable bunch connects to an electronic box arranged in the vehicle (not shown). In this case, there are fewer drawbacks in having contact pairs in the circuit since mechanical stress in the form of vibrations and, for example, atmospheric influence is considerably smaller, or can be controlled better.

Figure 2 shows a slightly different version of an ignition lock 16 adapted to the invention. The ignition lock 16 comprises an essential cylindrical lock housing 17 at which in order to enable a good screw tightening at for example a wheel tube console there are arranged tubular connection pieces 18 with through going holes for fastening bolts (not shown). At the lock house 17, around its one end 19, where an ignition key is intended to be entered,



the antenna housing 10 is arranged. The connecting cable to the antenna housing is, for the sake of clarity, omitted. The antenna housing 10 is essentially shaped as a ring with a hole in the middle, which hole is shaped so that it, suitably with a gliding fit, fits outside the lock housing 17. The cable  
5 14 which connects to the antenna enters the antenna housing 10 via the entry part 15.

In order to retain the antenna housing 10 in its position on the lock housing 17, the antenna housing 10 is provided with a pair of hooks 20, 21 which  
10 slightly enlarged are shown in Fig. 3. The hooks 20, 21 are arranged to interact with a T-shaped protrusion 22 on the lock housing 17, which protrusion is arranged with its "roof" against the lock end 19 so that, when the antenna housing 11 is attached to the lock housing 17 from the lock end 19, the hooks 20, 21 will grip into the "roof" of the T-shaped protrusion 22 and  
15 retain the antenna housing in this position. The hooks 20, 21 are, similarly to the rest of the antenna housing 10, made of plastic and can thus easily flex out in order to pass and grip around the "roof" of the protrusion 22, and the passage is facilitated by the hooks at their outer end having sloping bevelled edges 23.

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In order for the antenna housing 10 not to glide too far into the lock housing 17, it is provided with counteracting protrusions 24 which are arranged to receive the antenna housing 10 flush on when the hooks 20, 21 during assembly have snapped in behind the "roof" of the T-shaped protrusion 22. In  
25 this position, the antenna 9 can interact with a key 25 which has been entered into the ignition lock 16 for communication with the key during verification of the legitimacy of the key.

The invention is not limited to the above described examples which have  
30 been shown in the drawings, but is defined by the appended claims. For example, the antenna housing can be fastened on the ignition lock by other means. Neither it is of importance how the antenna is designed electrically. It

can consist of a simple coil of wire, or it can consist of a coil which has been etched onto a circuit board. The antenna can also be designed for attachment to the ignition lock with good communication with a key which has been entered into to lock without being directly attached to the ignition lock, although such an embodiment might necessitate other steps than an adaptation of the lock housing.



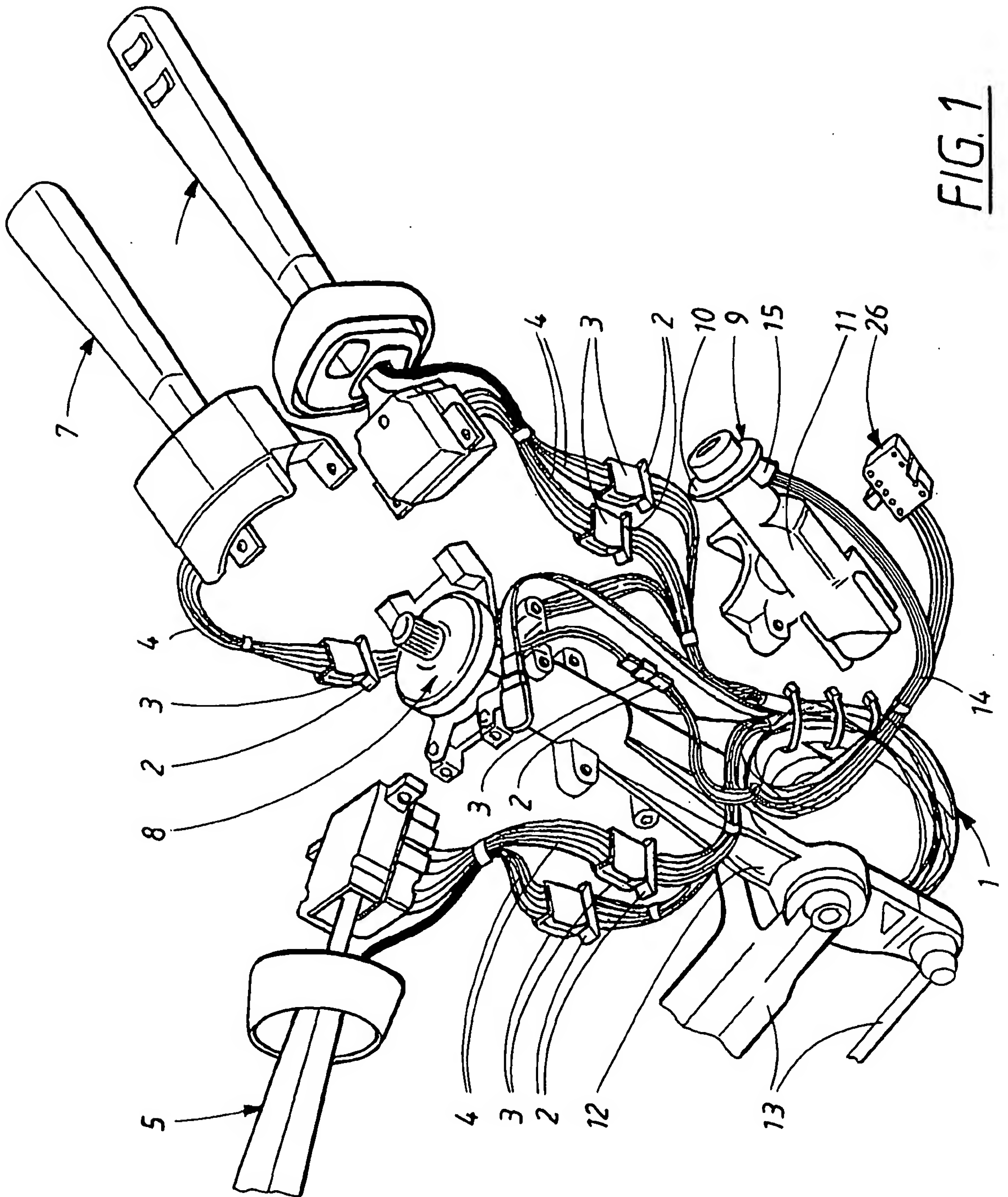
## CLAIMS

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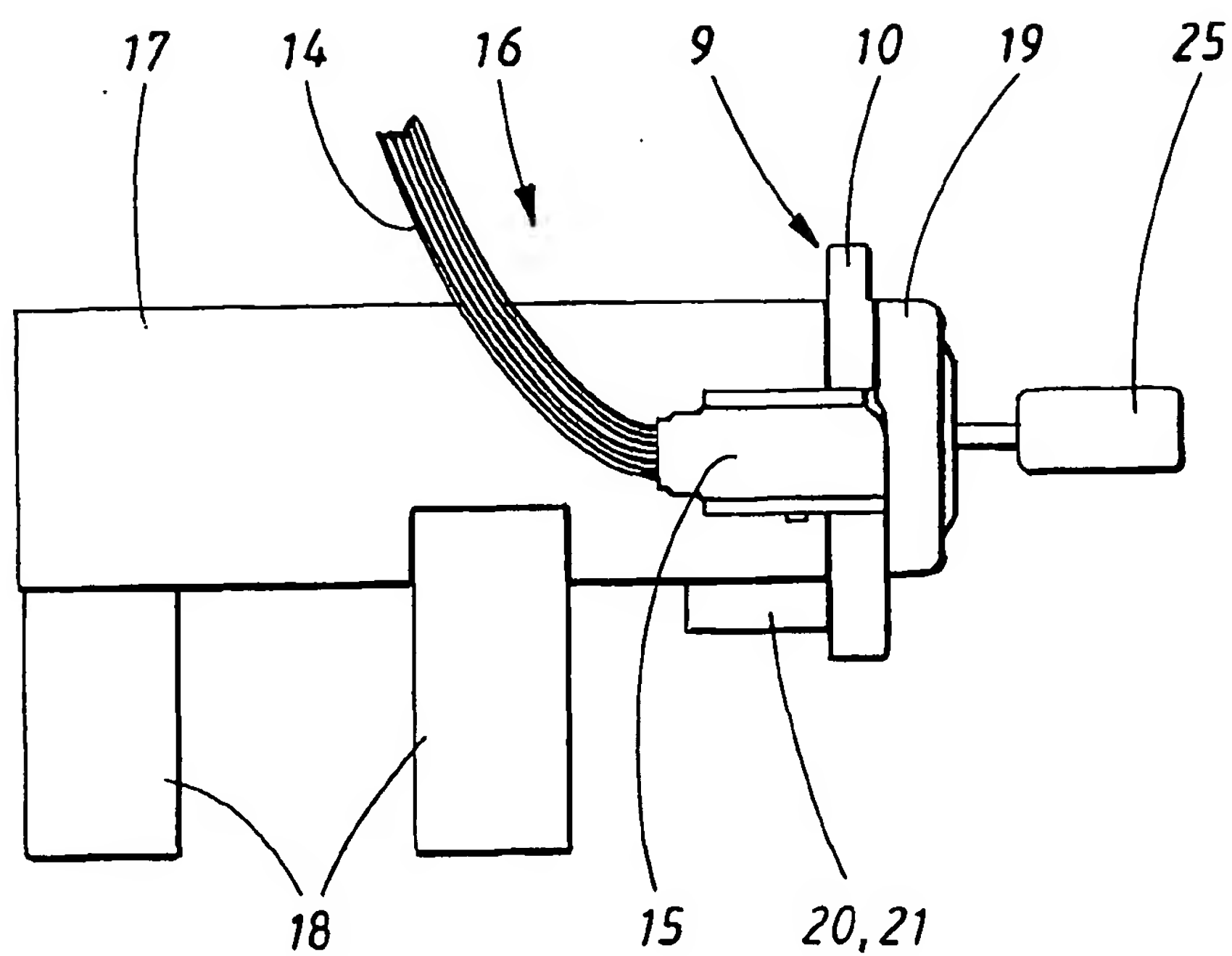
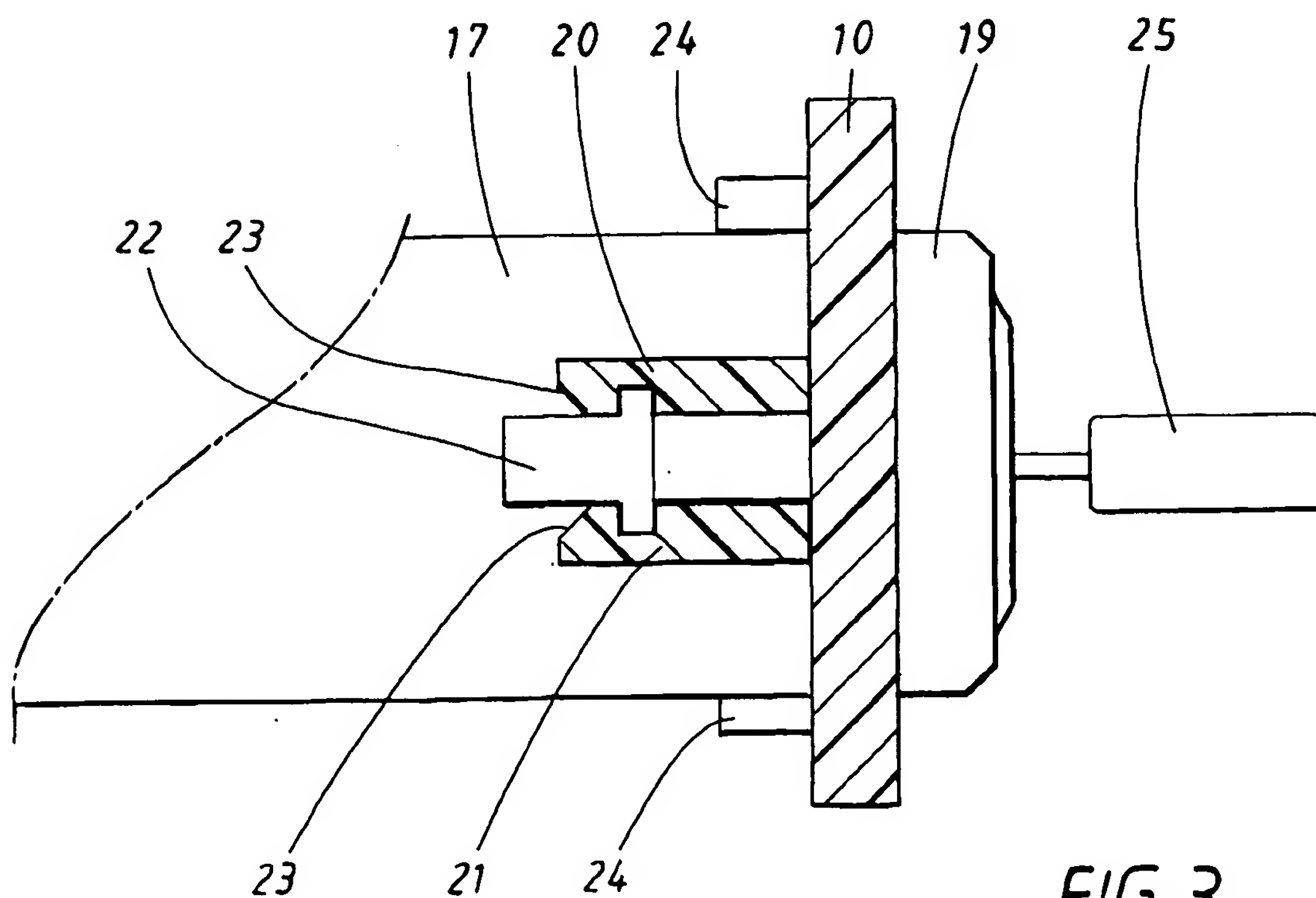
1. Device for vehicles which comprise an electrical cable bunch (1), a so-called ignition lock (11, 16) and an antenna (9) which is arranged adjacent to the ignition lock and interacts with a transmit/receive device, said antenna being arranged to communicate with a key (25) dedicated to the ignition lock  
10 (11, 16) c h a r a c t e r i z e d i n that the antenna (9) is electrically integrated in the cable bunch (1), directly connected to it, and in that the ignition lock (11, 16) and the antenna (9) can be assembled into one unit by means of interacting coupling means (20-22).
- 15 2. Device according to claim 1, c h a r a c t e r i z e d i n that the antenna comprises an antenna housing (10) which is provided with an opening, the shape of which corresponds to the outer form of the ignition lock (11, 17), across the ignition lock, at that end of it (19) which is intended for entry of the key, with the antenna housing being attachable outside of the ignition lock,  
20 and in that the antenna housing (10) is provided with first organs (20 21) for retaining the housing on the ignition lock during interaction with corresponding second organ (22) arranged on the ignition lock.
- 25 3. An electrical cable bunch for a motor vehicle, which bunch is intended to interact with an electronic antitheft-system, comprising an antenna for receiving signals from an ignition key dedicated to the vehicle and an electronic unit which processes the signals from the antenna c h a r a c t e r i z e d i n that the antenna is contactlessly integrated in the cable bunch.

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FIG. 1



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FIG. 2FIG. 3

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 02/00607

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B60R 16/02, B60R 25/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1071158 A2 (SIEMENS AUTOMOTIVE CORPORATION), 19 July 2000 (19.07.00), column 1, line 5 - line 45, figures 4,5 --	1-3
X	DE 19520211 A1 (STRATTEC SECURITY CORP), 1 February 1996 (01.02.96), column 8, line 59 - line 67, figures 4,5 --	1-2
A	US 5729057 A (HENRYK FRENZEL ET AL), 17 March 1998 (17.03.98), abstract -- -----	1-3

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
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"&amp;" document member of the same patent family

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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/SE 02/00607**

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
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